Some issues, such as block timetabling and student transcription services, require specific funding; modularizing the pre-clinical years for Medical, Veterinary Science and Dentistry students will be addressed by most universities in the throes of changing their curriculum after the majority of their provision conforms to their chosen scheme. The common pattern that is emerging among universities in terms of standard size units, length of units and credit tariff is probably the most powerful indication that a national framework is emerging which will enable them to offer the flexible learning opportunities that the CAT philosophy and modular structure and curriculum offer.

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Credit accumulation and transfer schemes

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This paper describes the principles and operation of credit accumulation and transfer schemes (CATS) in the U.K. by focusing on five key components: (1) the Council for National Academic Awards (CNAA) CAT scheme; (2) the credit tariff system; (3) student-negotiated programmes; (4) credit rating or accreditation; and (5) institutional CAT schemes which have been a recent rapid development.

(1) The CNAA CATS scheme

The CNAA CAT scheme was set up in 1986 on a pilot basis to operate in the London area. Its original objectives were to widen and increase access to CNAA's awards by enabling students to register with the scheme, programmes of study drawn, not from single institutions, but from courses and course units across institutions. An important element was that students could also claim credit for any prior studies on courses they may have already undertaken.

The rationale for the scheme was that for the economic well being of the country it was vital that mature and experienced people were attracted into higher education, and that there would be more encouragement for such students through a credit-based system where students would be able to, (i) achieve credits for their prior learning; (ii) accumulate credits at a pace suited to their other commitments; and, (iii) design programmes more suited to their individual needs.

Quite early on the decision was taken to offer CATS nationally and for it to become both a polytechnic and university initiative. CNAA negotiated a credit transfer arrangement with the University of London to add to the agreement it already had with the Open University. Agreements with several other universities soon followed.

As well as providing programmes of study for centrally registered students, CATS also operate a student advisory service which provides information to mature students on the study opportunities available to them and advice on the credits they might receive for any prior learning.

Operationally the CAT scheme is relatively small. About 50 students each session are centrally registered, about 500 students receive detailed advice on study or credit opportunities but seek registration elsewhere, and a further 500 receive basic information about credit transfer. However, CNAA's intention was always to limit the scope of student registration and to concentrate on demonstrating that such CATS approaches were academically sound and to develop an overarching framework for CATS which could be utilized by institutions. This brings us to the second component of CATS, the credit tariff system.

(2) The credit tariff system

To facilitate credit accumulation and transfer a credit tariff was devised based upon the benchmarks of the honours degree (for which 360 credits are required at undergraduate levels 1, 2, and 3) and the Master's degree (for which 120 credit points are required at 'M' level).

Academic institutions began to assign credits to their courses and course units so that CATS students could more easily identify the academic value of a course unit before deciding whether to incorporate it in their programme.

Typically higher education institutions have assigned credits to course units on the basis of notional study time. However, some institutions are beginning to look at different models such as notions of competence or learning outcomes. There

Abbreviations used: CATS, credit accumulation and transfer; CNAA, Council for Academic Awards.
remains no single definition of credit, although one credit for 10 h of study time seems to be common.

(3) Student-negotiated programmes
It is important to point out that the CNAA CATS arrangements for student programmes are not based upon a pick ‘n’ mix system. There are rules and regulations governing the approval of each student programme to do with coherence, progression and balance. The accumulation of 360 credit points does not automatically equal a degree. Particularly where a named award is being pursued there will be prerequisite or core units built into the programme. However, overall the onus has shifted in CATS to the individual student and his/her academic supervisor to demonstrate the academic credibility of the programme. The final decision whether or not to approve a programme lies with the scheme’s Registration Board which is made up of key individuals drawn from colleges, polytechnics, universities, industry and the professions.

The scheme has attracted highly motivated students with clear ideas of the future use they wish to make of their learning. About 85% of CATS students are over 25 years of age. Interest has been greatest in the areas of in-service teacher education, computing/information technology, management and health studies.

(4) Credit Rating or accreditation
An important development early on in the life of CATS was the agreement by CNAA’s governing council to allow non-higher education courses to be recognized as credits towards CNAA awards. It was agreed that credits could be assigned to employment-based programmes, vocational training, professional qualifications and short courses. This led to the adoption of a key principle upon which the scheme’s activities have subsequently been based, namely that, ‘learning wherever it occurs, and provided it can be assessed, should count for credit against the Council’s awards.’

This development of recognizing ‘non-higher education’ courses led to the enhanced availability of learning opportunities within student programmes, and also to the possibility of prior credits being granted for work-based learning.

To recognize non-higher education programmes for credit, it was necessary to establish a credible system of assessing such programmes. CNAA CATS has developed a model which is similar to that which it operates for the validation of courses. Any organization which wishes to have evidence which satisfactorily answers three key questions, (i) what is learnt? (ii) how is that learning assessed? and (iii) how is the quality of that learning and assessment maintained and controlled.

The organization must provide evidence of the learning derived from the programme and great stress is placed upon the assessment criteria and methods. This is often a problem with employment-based programmes, which traditionally have not been assessed. One way round this problem has been to contract this assessment process to an academic institution or a group of academic staff.

The evidence submitted by an organization is scrutinized by a panel of experts within the relevant subject area and judged against general notions of academic standards in that area. To date over 50 non-higher education organizations have received credit ratings from CNAA. Credit rating validation does not lead to an award being granted. Furthermore the credit points assigned by CNAA CATS have only an advisory status. A student who has completed a programme which has been credit rated by CNAA CATS must negotiate the use of those credits on an actual course or through its CATS scheme. An institution can lower the number of credit points assigned depending upon how the content of these credits matches the content of the fresh course that the student wishes to complete.

(5) Institutional CAT schemes
Inevitably many CNAA institutions have developed their own CAT schemes, seeing CATS as a means of widening and increasing access to their courses. By 1988/89 polytechnics such as Newcastle, Sheffield, Lancashire, Liverpool and Wolverhampton had begun to introduce and gain CNAA approval for institutional CAT schemes which have the powers for the negotiation by individual students of cross-institutional CAT programmes and which also involve procedures for credit rating or accreditation. Now there are some 40 schemes, many based upon modular structures, but not all.

These institutions have not necessarily taken on board the CNAA CATS regulations or its credit tariff. Indeed it was not intended that they should do so because of the whole notion of flexibility which underpins the philosophy of CATS. Consequently polytechnics such as Liverpool and Lancashire employ different tariffs, and nationally there is no real commonly agreed definition of what a ‘credit’ is.

Conclusion
In five years CATS has become a major feature of higher education. CATS has created a portable
system of crediting learning of all kinds towards a qualification. This has provided a ladder into higher education for those without the traditional entry qualifications. It has also provided bridges between work, polytechnic, university and college.

Many of the actual procedures adopted in the operation of CATS in the U.K. are based upon those used in higher education generally. The procedures for credit rating or accreditation follow closely the procedures for validation. It relies on a system of peer review where decisions are based upon expert judgements not on mathematics, and where quality assurance systems such as monitoring and review are also utilized.

In the negotiation of student programmes, judgements and coherence, balance and progression are made, rules and regulations are applied and there are no pick 'n' mix type systems. In assessments the same notions of standards are used whether one is assessing work-based credits or a traditional academic dissertation. Thus CATS should not be seen as an opponent of traditional higher education standards but as a new, and perhaps more flexible, user-friendly ally.

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Credit accumulation and transfer: a view from the chalkface

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'We must first ask why it is that the Government is apparently both ignorant of the function of the universities and, at best, ambivalent in its attitude to them. The ambivalence stems from a deep confusion about what it wants of the universities. On the one hand they must be in the forefront of teaching and research... on the other hand they must exist without any increase, and preferably with a steady reduction, in direct funding. Again they must admit more students... but in no circumstances must academic standards decline. We are piously told that the function of the universities is cultural and educational in the widest sense, yet at the same time all departments are required to show their cost-effectiveness, with output measured against input in the manner of a commercial company. Finally, members of the universities are expected to produce top-class work both in teaching and research while suffering from the contempt of Government, plainly shown by low levels of salaries and accusations of being out of touch...'

This long quotation is taken from Mary Warnock's superb short essay [1], which should be compulsory reading for all involved in changing higher education in the U.K. The feeling of being held in contempt as academics, and the insistence that academic standards must be maintained, leads eventually to intense frustration and, ultimately, to disillusionment. The reality of the situation seems to be glossed over in many reports [2-5] recommending educational changes, such as the introduction of credit accumulation and transfer schemes (CATS). In practice, there are no 'Brownie Points' (at least in the university sector) for being a committed teacher enthusiastic for change. This is admitted publicly in the recent 'Green Paper' published by the Committee of Vice-Chancellors and Principals [6]. The first reactions of a number of senior academic 'managers' to its recommendations for identifying and rewarding good teachers has not been very encouraging. This is potentially very serious, since enthusiasm for change by those at the academic chalkface is readily killed unless efforts are recognized and rewarded. We have only to look at schools to see the long-term effects of enforced rapid change, diminished resources and lack of esteem.

These comments are meant to put the debate about CATS into context, and are not meant to detract from the educational advantages that CATS could have for some of our biochemistry students. Clearly, for mature students CATS could provide an ideal opportunity to continue their biochemistry course if they had to move house, or were only able to study part-time. It would also recognize relevant prior experience, for example in a hospital laboratory. These advantages would apply to both BSc and MSc biochemistry courses.

For the great majority of undergraduates entering into biochemistry courses directly from school, the educational advantages of CATS are far